What is claimed is:

1. A method of controlling characteristics of a plasma in a semiconductor substrate processing chamber using a dual frequency RF source, comprising:

supplying a first RF signal to a first electrode disposed in a processing chamber; and

supplying a second RF signal to the first electrode, wherein an interaction between the first and second RF signals is used to control at least one characteristic of a plasma formed in the processing chamber.

2. The method of claim 1, wherein the plasma characteristic is at least sheath modulation.

3. The method of claim 2, wherein the first and second RF signals are of a low enough frequency to provide a strong self-biasing sheath in the plasma.

4. The method of claim 2, wherein the first RF signal provides a broad ion energy distribution and the second RF signal provides a peaked, well defined ion energy distribution.

5. The method of claim 4, wherein the first RF signal has a cycle time that is larger than the transit time of an ion in the sheath, and wherein the second RF signal has a period that is nearly equal to or greater than the transit time of an ion in the sheath.

6. The method of claim 2, wherein the combined applied voltage of the first and second RF signal is used to control a peak-to-peak sheath voltage and a self-biased DC potential.

7. The method of claim 6, wherein the interaction between the first and second RF signals is a ratio of their applied power.

8. The method of claim 7, wherein the ratio is used to tune the energy distribution about an average acceleration generated by the DC potential.

9. The method of claim 1, further comprising:

supplying a third RF signal to a second electrode to form the plasma.

10. The method of claim 1, wherein the plasma characteristic is at least a power distribution within the plasma.

11. The method of claim 10, wherein the first and second RF signals provide similar plasma excitation properties and different spatial uniformity profiles.

12. The method of claim 11, wherein the interaction between the first and second RF signals is a varying effect on the power distribution in the plasma.

13. The method of claim 12, wherein the first and the second RF signals are selected such that a combined effect of the first and second RF signals produces a substantially flat power distribution.

14. The method of claim 12, wherein the interaction between the first and second RF signals is used to control the uniformity of a plasma enhanced etch process.

15. Apparatus for controlling characteristics of a plasma in a semiconductor substrate processing system, comprising:

a first electrode disposed within a processing chamber;

a first RF source for providing a first RF signal coupled to the first electrode through a match network; and

a second RF source for providing a second RF signal coupled to the first electrode through the match network, wherein the match network has a single feed to the first electrode and wherein the first and second RF sources are adapted to provide a manipulable interaction for controlling at least one plasma characteristic.

16. The apparatus of claim 15, further comprising:

a third RF source for providing a third RF signal coupled to a second electrode disposed in the chamber.

17. The apparatus of claim 16, wherein the first electrode is disposed in a substrate support pedestal contained in the processing chamber and the second electrode is disposed proximate a roof of the processing chamber above the support pedestal.

18. The apparatus of claim 16, wherein the third RF signal coupled to the second electrode is used to form a plasma.

19. The apparatus of claim 15, wherein the first electrode is disposed in a substrate support pedestal contained in the processing chamber.

20. The apparatus of claim 15, wherein the processing chamber is an etch reactor.

21. The apparatus of claim 15, wherein the plasma characteristic is at least sheath modulation.

22. The apparatus of claim 21, wherein the first and second RF signals are each of a low enough frequency to provide a strong self-biasing sheath in the plasma.

23. The apparatus of claim 21, wherein the first RF signal provides a broad ion energy distribution and the second RF signal provides a peaked, well defined ion energy distribution.

24. The apparatus of claim 23, wherein the first RF signal has a cycle time that is larger than the transit time of an ion in the sheath, and wherein the

second RF signal has a period that is nearly equal to or greater than the transit time of an ion in the sheath.

25. The apparatus of claim 21, wherein the combined applied voltage of the first and second RF signal is used to control a peak-to-peak sheath voltage and a self-biased DC potential.

26. The apparatus of claim 25, wherein the manipulable interaction between the first and second RF signals is a ratio of their applied power.

27. The apparatus of claim 26, wherein the ratio is used to tune the energy distribution about an average acceleration generated by the DC potential.

28. The apparatus of claim 15, wherein the plasma characteristic is at least a power distribution within the plasma.

29. The apparatus of claim 28, wherein the first and second RF signals provide similar plasma excitation properties and different spatial uniformity profiles.

30. The apparatus of claim 29, wherein the manipulable interaction between the first and second RF signals is a varying effect on the power distribution in the plasma.

31. The apparatus of claim 30, wherein the first and the second RF signals are selected such that a combined effect of the first and second RF signals produces a substantially flat power distribution.

32. The apparatus of claim 30, wherein the manipulable interaction between the first and second RF signals is used to control the uniformity of a plasma enhanced etch process.